**REMARKS**

In the Office Action Summary accompanying the Office Action mailed November 6, 2002 there was no indication of the number of claims pending. In addition, in the Advisory Action obtained in parent application Serial No. 09/719,166, it was unclear whether the Examiner was entering the amendment after final rejection which was submitted on September 3, 2002. In the Request For Continued Examination (RCE) in the present application dated October 21, 2002, it was requested that the Examiner consider the amendment under 37 CFR 1.116 filed on September 3, 2002. However, without a specific acknowledgement that this amendment has been considered or entered, applicant cannot be certain that this amendment was entered. It is respectfully requested that this Amendment After Final Rejection be made of record, entered in this case and acknowledged in the next office action. Claims 1-8 remain in the application.

Reconsideration is respectfully requested of the rejection of Claims 1 and 7 under 35 U.S.C. § 112, second paragraph, as being indefinite in the use of the term "low catalytic activity".

In the rejection the Examiner appears to equate indefiniteness to a term which may be relative. It is respectfully submitted that the courts in the U.S. have not taken that position, but instead considered what one of ordinary skill in the art would regard as definite or indefinite. For example, the term "high styrene resin" has been upheld as being definite. See In re Core, 146 USPQ 69.

Moreover, the court in Burlington Industries, Inc., v. Quigg, 229 USPQ 916 upheld the use of the term "pure water"; "minor amount" was upheld as being definite in Ex parte Freeman, 100 USPQ 315 and the term "small increment" was upheld as being definite in Ex parte Martinex, et al., 159 USPQ 696.

In view of these authorities, it is respectfully submitted that relative terms are not necessarily indefinite. To assist the Examiner in his evaluation, applicant is hereby attaching hereto a certified English translation of a Japanese document entitled, "Curing of Epoxy Resins Using Novel Sulfonium Salts/Curing By Means of Thermally Latent and Photolatent Curing Catalysts", which is from the Japan Adhesive Institute, Vol. 28, No. 7, pages 263-271 (1992). The Japanese version of this article was submitted in the amendment filed on September 3, 2002 in the parent application, but the Examiner indicated in an Advisory Action to this amendment that the article was unreadable and the Examiner would need an English language translation to consider the teachings disclosed therein. Accordingly, a certified English translation of this article has been prepared since it is believed to be of assistance to the Examiner.

As previously pointed out, this article demonstrates that onium salts stable at high temperatures for a short period but having catalytic activity at a low temperature of about 40°C for a longer time period are well known in the art before the invention of Lamanna, et al. Particularly, using the sulfonium salts 2a and

2b described in Table 1 of the article (page 5 of the English translation), a mixture of the respective salts with phenol glycidyl ether formed a gel after 4 and 20 hours, respectively, at a temperature of 40°C as illustrated in Table 3 appearing on page 11 of the English translation. It is respectfully submitted that this means that these salts have catalytic activity at 40°C.

On the other hand, Table 1 of this article appearing on page 5 of the English translation discloses that the melting points of the salts 2a and 2b are, respectively, 114°C - 116°C and 167° - 168°C. Thus, these salts are stable for the short time period needed for measuring the melting point. In addition, although deterioration has partially occurred, such deterioration is not a problem since the time period for measurement of the melting point is very short.

It is respectfully submitted that this data establishes that onium salts stable at high temperatures for a short time period but having a catalytic activity at about 40°C for a longer time period were well known in the art before the date of the invention of Lamanna, et al.

Also attached hereto is a Declaration under 37 CFR 1.132 by Dr. Hiroji Fukui dated February 20, 2003. In his Declaration Dr. Fukui indicates that he has a ph.D in Engineering from Kyoto University and that he has been employed by Sekisui Chemical Co., Ltd. since April 1995. Dr. Fukui further indicates that he is the coinventor of this application and indicates in his affidavit on

page 3 that the term "low catalytic activity" of a catalyst as included in the claims of the present application means that the catalyst has an extremely low activity of practically no catalytic activity at a temperature in the range of 20°C - 80°C. He also states that since in a composition of the present invention containing this catalyst and compound having an epoxy group, an activity of the above catalyst has an extremely low activity or no activity in the range of 20°C - 80°C, and the composition is practically not cured or not gellated. That is to say, catalytic activity with which the above composition is practically not cured or not gellated is called "low catalytic activity".

Further, Dr. Fukui indicates that a proton generated due to thermal decomposition of the catalyst itself and thus generated proton is added to an epoxy group to reveal the activity of the catalyst. After the proton is added to an epoxy group, an active species is generated that can attack an epoxy group to thereby drive a reaction of an epoxy group like a chain reaction. As a result, polymerization or a crosslinking reaction increasing a molecular weight is performed to cause gellation, and a liquid composition is thereby gellated and cured into a solid.

In paragraph (2) bridging pages 3 and 4 of his Declaration, Dr. Fukui explains the units used in Table 3 of the English translation of the article, "Curing of Epoxy Resins Using Novel Sulfonium Salts", which is attached hereto. Dr. Fukui explains that Table 3 is to be interpreted as follows:

For example, 180 and 190 indicate temperatures and "3" and "28" indicate a gellation time. That is, it is shown that gellation time is 3 seconds at a temperature of 180°C.

Also explained was the meaning of gellation time of an epoxy group containing resin using a thermodecomposable onium salt cationic catalyst. Dr. Fukui explained that an onium salt is at first thermally decomposed in an epoxy group containing resin to produce a proton. Then, the proton attacks an epoxy group to cause a chain reaction of epoxy groups, that is a ring open polymerization.

In the case where the resin with two or more epoxy groups is used such as described in this article, the chain reaction is in progress and at the same time not only does a ring opening polymerization make progress, but also a crosslinking reaction occurs. As a result, a solvent-insoluble gel is produced. The time consumed for production of the solvent and soluble gel is the gellation time.

Dr. Fukui explains in the second paragraph on page 4 of his Declaration that the gellation time is evidence to prove occurrence of a reaction of epoxy groups. That is, if a pressure-sensitive adhesiveness is extremely low and the composition has been cured like a plastic, this phenomenon is called "cure".

When the series of reactions is evaluated with a thermal analysis apparatus, there is observed in addition to an endothermic phenomenon accompanied with a phase transition, an endothermic

phenomenon due to thermal decomposition of an onium salt and an exothermic phenomenon due to a chain reaction which is a ring opening polymerization of epoxy groups. The exothermic phenomenon are referred to, for example, in the prior art of Lamanna, et al., U.S. Patent No. 5,554,664.

Dr. Fukui also explains in the paragraph at the bottom of page 4 and the paragraph on the top of page 5 in the composition relating to the present invention has no exothermic peak in a DSC data chart at least at a temperature in the range of 20-80°C. Further, that in Table 3 of the article entitled, "Curing of Epoxy Resins Using Novel Sulfonium Salts/Curing By Means of Thermally Latent and Photolatent Curing Catalysts", a description is given that gellation occurs in a composition containing an epoxy resin A, which is a bisphenol A type epoxy resin, a compound 2a and phenyl glycidyl ether in a time of 115 sec. at 120°C.

It is also pointed out that in Table 6 of this article observation is made on the storage stability at 40°C, which reveals the fact that gellation occurs on the fourth day from the start of storage.

Accordingly, the compound 2a has an activity at a temperature in the range of 20-80°C. Finally, Dr. Fukui points out that in Table 3 of this article a description is given of no data concerning the compound 2b, but data is described concerning a compound 2f. There it is shown that the compound 2f as well as a thermocatalytic activity at a temperature of 40°C similar to the

case of the compound 2a.

In view of the above-cited authorities and the English translation of the article, "Curing of Epoxy Resins Using Novel Sulfonium Salts/Curing By Means of Thermally Latent and Photolatent Curing Catalysts", and the Declaration of Dr. Fukui, it is respectfully submitted that this article establishes that onium salts stable at high temperature for a short time period but having catalytic activity at about 40°C for a longer time period were well known to the art before the date of the invention of Lamanna, et al. This evidence also establishes, it is submitted, that the term "low catalytic activity" is not indefinite. Consequently, it is respectfully submitted that the Examiner would be justified in no longer maintaining the rejection. Withdrawal of the rejection under 35 U.S.C. § 112 is accordingly respectfully requested.

Reconsideration is respectfully requested of the rejection of Claims 4 and 8 under 35 U.S.C. § 102(b) as being anticipated by Lamanna, et al.

As previously pointed out, the present invention relates to a cationic photocatalyst composition and a photocurable composition which can assure a sufficient open time after irradiation and enhance the adhesive strength after the cure. These goals are accomplished by using a cationic photocatalyst composition comprising a photosensitive onium salt having a low thermal catalytic activity in the approximate temperature range of 20-80°C, together with a compound either represented by Formula (1) in the

claims or having, as a substituting group, a structure of formula (1).

Applicant unexpectedly discovered that when such a composition is used in combination with a cationically photopolymerizable compound and irradiated, the action of the compound represented by the Formula (1) not only insures a sufficient open time after irradiation, but also results in the provision of a cured product which has been unexpectedly found to exhibit the same level of adhesion as those obtained by using conventional cationic photocatalysts. (See Specification, page 40, lines 11-24.)

This type of adhesive is especially advantageous where a sufficient open time is needed such as to allow easy joint operations before curing of the adhesive. Also, the adhesive of the present invention also provides sufficient adhesive strength after cure, as well as enhanced adhesion and durability. (See Specification, page 41.)

The Lamanna, et al. reference discloses photocurable compositions comprising cationic photoinitiators with fluorocarbon anions. The salts of the anions and cations described in Lamanna, et al. may be activated by radiation or by heat or may require two-stage activation involving radiation followed by heat. (Column 8, lines 58-60.) The Lamanna, et al. reaction may use a catalyst or initiator salt prepared by anion exhange or metathesis reactions by combining initiator or catalyst free acids or salts that contain conventional counter anions. Generally metathesis reactions can be

carried out at temperature ranges from about -80°C to about 100°C. (Column 9, lines 13-21.)

In contrast, the composition of the present invention is activated not by thermal polymerization, but instead by photopolymerization. This is advantageous since it avoids thermal polymerization during storage in areas where excessive temperatures may initiate polymerization while on the shelf. Accordingly, the onium salts of the present invention have low thermal catalytic activities.

As discussed above, the Lamanna, et al. reference describes energy sensitive salts which are activated by photo energy, thermal energy and the like. These salts have a particular fluorocarbon anion as a counter anion. However, the onium salts of the present invention have no fluorocarbon anion.

Importantly, there is no disclosure whatever in the Lamanna, et al. reference of onium salts having low thermal catalytic activity in the temperature range of 20°C to 80°C. In this connection, the Examiner's attention is directed to Lamanna, et al. which discloses in Example 5 (column 22 and 23) and Table 3 DSC data of curable compositions comprised of bisphenol A type epoxy resin (EPON 828), ethylene oxide chain-extended bisphenol A type polyols (SYN PAC 8024) and different benzocainium salts. In Table 3 there is presented DSC data of the curable composition containing three onium salts.

As can be seen from Table 3, when salt a) is used, the heat of

reaction is generated at a temperature of from 78°C, and the peak of heat generation is observed at 91°C. In case of salt b), the heat of reaction is generated from 58°C, and its peak is reached at 80°C. In case of using the salt c), the heat of reaction is observed at 62°C and 87°C. In case of using the salt d), the heat of reaction is observed from 48°C, and the 1st peak is at 68°C.

On the basis of this clear and unambiguous disclosure of Lamanna, et al., it is respectfully submitted that those skilled in the art would readily understand that any of the onium salts shown in Table 3 of Lamanna, et al. have catalytic activity in a temperature range of not higher than 80°C.

Further, Lamanna, et al. describe in column 26, lines 55 to 57 that "The activity of this product was verified by adding it to cyclohexene oxide, which polymerized rapidly and exothermically". It is respectfully submitted that this test result provides additional evidence to those skilled in the art who would, with this reference before them, readily understand that at least the onium salt $Cp2FeC(SO_2CF_3)_3$ is catalytically activated at room temperature (20°C to 30°C).

Further, Lamanna, et al. show in Table 8 and column 28 that curable compositions using $Cp_2FeN(CF_3SO_2)_2$ or $Cp_2FeC(SO_2CF_3)_3$ has a curing time of 82 or 39 seconds, respectively, at 80°C. The fact that these reactions occur in much short times means that the onium salts are catalytically activated at temperatures of no higher than 80°C.

In the present case, the Lamanna, et al. reference fails to disclose photosensitive onium salts having low thermal catalytic activity in the approximate temperature range of 20°C to 80°C as now called for in the claims herein. This important property of the claimed composition is nowhere disclosed or even suggested by Lamanna, et al. On the contrary, a cationic photocatalyst composition containing a photosensitive onium salt having low catalytic activity in the approximate temperature range of 20°C to 80°C is found only in the present application, and constitutes an important element or aspect of the present invention.

Moreover, applicant respectfully submits that the claimed onium salts have extremely low activity or have no catalytic activity at 20-80°C. In this connection, the Examiner has stated that the salt D shown in Table 3 of Lamanna, et al. has a low activity at lower temperature ranges such as 20-80°C. On this point, applicant is hereby submitting the Declaration under 37 CFR 1.132 of Hiroji Fukui dated February 20, 2003 concerning the salt D in Lamanna, et al. and test data and comparative tests. In his Declaration Dr. Fukui states that salt D has sufficient activity at 20-80°C.

Particularly, as shown from Table 2 of Lamanna, et al., the salt D, however, has sufficient activity at 20-80°C. Particularly, as shown from Table 2 of Lamanna, et al., calorific power at peak 1 is 35.6J/g, while the amount at peak 2 is 307.7 J/g. A

coefficient of reaction is generally proportional to a calorific power, if a reaction matrix is the same. In Example 5, the reactions are completed at heat production at peaks 1 and 2, respectively, and experiments confirming peaks 1 and 2 are successive operations. Thus, the coefficients of reaction as to respective peaks 1 and 2 are as follows:

The coefficient of reaction as to peak 1 is 35.6/(35.6+307.7)X 100=10.4%.

The coefficient of reaction as to peak 2 is 307.7/(35.6+307.7)X100=89.6%.

Further, Dr. Fukui said that the reaction sufficiently occurs within a range of 48-60°C and the salt D has catalytic activity in the reaction showing as peak 1.

In contrast, the claimed onium salts in the present invention does not have such sufficient activity within a range of 20-80°C. Dr. Fukui enclosed experimental data to support this argument including DSC charts of a composition A and B as shown in Table 1 of his Declaration. Dr. Fukui states that the composition A is that of a comparative example 1 described in the text of the present application and composition B is prepared in accordance with Example 5 of Lamanna, et al., except that an onium salt SP-170 which is used in the present invention, is used as the catalyzer. The temperature elevation rate is set to be 10°C/per min., namely, the same rate as in Lamanna, et al. and measurements are performed within a range of 20-80°C. The results of these tests are shown in

the chart attached to Dr. Fukui's Declaration. This data shows that there are no peaks in the DSC charts of compositions A and B.

Further, Dr. Fukui states that as described in Lamanna, et al. Example 2 shows clear peaks within a range of 20-80°C. Comparison of the results of compositions A and B with the result of Example 2 of Lamanna, et al. clearly shows that the present claimed onium salt has extremely low or no catalytic activity within a range of 20-80°C while the salt of Lamanna, et al. has sufficient activity enough to show such DSC peak within a range of 20-80°C.

Dr. Fukui concludes that in view of the test data it is clear that the salt D of Lamanna, et al. has sufficient activity within a range of 20-80°C.

The fact that onium salts can be synthesized at 20°C to 80°C does not mean that these salts have low catalytic activity at the temperature range of 20°C to 80°C. A low reaction activity with an epoxy resin is not directly related to the heat stability of the catalyst.

A chemical compound and its properties are inseparable. A formula is not the compound or what is patented. Patentability does not therefore depend solely upon the similarity of the formula of the claimed compound to that of a prior art compound. In re Ward, 141 USPQ 227 (CCPA, 1964).

In the present case, the Lamanna, et al. reference fails to disclose photosensitive onium salts having low thermal catalytic activity in the approximate temperature range of 20°C to 80°C as

called for in the claims herein. This important property of the claimed composition is nowhere disclosed or even suggested by Lamanna, et al. On the contrary, a cationic photocatalyst composition containing a photosensitive onium salt having low catalytic activity in the approximate temperature range of 20°C to 80°C is found only in the present application, and constitutes an important element or aspect of the present invention.

For these reasons, it is respectfully submitted that Lamanna, et al. does not disclose all of the claimed elements of the present invention. Therefore, the rejection fails, as a matter of law in view of the above authority. Consequently, the Examiner would be justified in no longer maintaining this rejection. Withdrawal of the rejection is accordingly respectfully requested.

Reconsideration is respectfully requested of the rejection of Claims 1-3 and 6-7 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Lamanna, et al.

The Lamanna, et al. reference is discussed at length above.

It is respectfully submitted that there is no disclosure in Lamanna, et al. of a cationic photocatalyst composition comprising a photosensitive onium salt having a low thermalcatalytic activity in the approximate range of 20-80°C in combination with a compound represented by formula 1 or having, as a substitute group, a structure of formula 1. On the contrary, that teaching or suggestion comes only from the present application and constitutes

an important element or aspect of the present invention. Failing such a disclosure of an important aspect of the present invention, it is respectfully submitted that the rejection fails.

Further, the salt D referred to by the Examiner is discussed at length in the Declaration of Dr. Hiroji Fukui dated February 20, 2003. In view of the experimental data presented in that Declaration, it is clear that the salt D of Lamanna, et al. has sufficient activity within the range of 20-80°C, and could not be said to have low thermalcatalytic activity in the approximate temperature range of 20-80°C. Therefore, it is respectfully submitted that low thermalcatalytic activity in the approximate temperature range of 20-80°C is not an inherent property of the onium salt of Example 5. In view of the foregoing, it is respectfully submitted that the Lamanna, et al. reference in no way anticipates or renders unpatentably obvious the subject matter of Claims 1-3 and 6-7. Consequently, the Examiner would be justified in no longer maintaining this rejection. Withdrawal of the rejection is accordingly respectfully requested.

Reconsideration is respectfully requested of the rejection of Claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Lamanna, et al.

The Lamanna, et al. reference is discussed above.

It is respectfully pointed out that Claim 5 is dependent upon Claim 2 which in turn is dependent upon Claim 1. Therefore, Claim 5 includes all of the limitations of Claims 1 and 2. As pointed

out above, the Lamanna, et al. reference fails to anticipate or render unpatentably obvious the subject matter of Claims 1 and 2. For this reason, it is respectfully submitted that it likewise does not render unpatentably obvious the subject matter of Claim 5.

Moreover, there is no suggestion or teaching in any of the references of record to support the proposition that it would have been obvious for one of ordinary skill in the art to add thioxanthone as a photosensitizer to the compositions taught by Lamanna, et al. In any event, even if it was, one would not obtain the composition as now called for in the claims herein. In view of the foregoing, it is respectfully submitted that the Examiner would be justified in no longer maintaining this rejection.

Reconsideration is respectfully requested of the rejection of Claims 1-3 and 6-7 under 35 U.S.C. § 103(a) as being unpatentable over Mahoney, et al. in view of Lamanna, et al.

The Lamanna, et al. reference is discussed at length above.

It is also noted that the Examiner recognized in the Office Action dated December 12, 2001 that Mahoney, et al. does not expressly teach using onium salts in the organometallic initiator system. Since Lamanna, et al. fails to disclose a cationic photocatalyst composition having a photosensitive onium salt with low thermal catalytic activity in the approximate temperature range of 20°C to 80°C, it follows that the substitution of the initiator system of Lamanna, et al. in the composition taught by Mahoney, et al. would not yield the cationic photocatalyst composition of the

present invention.

The mere fact that references can be combined does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Fritch, 23 USPQ 2d 1780 (CAFC, 1992). Citing references that indicate that isolated elements and/or features recited in the claims are known is not a sufficient basis for concluding that the combination of claimed elements would have been obvious. Ex parte Hiyamizu, 10 USPQ 2d 1393 (BPAI, 1988).

In the present case, it is apparent that a combination of references cited relies upon isolated elements or features now called for in the claims herein. However, this is not a sufficient basis for concluding that the combination is obvious. For this reason, it is respectfully submitted that the rejection fails as a matter of law. Consequently, the Examiner would be warranted in no longer maintaining the rejection. Withdrawal of the rejection is accordingly respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action and allowance thereof is accordingly respectfully requested. In the event there is any reason why the application cannot be allowed at the present time, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems.

Respectfully submitted

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**DOCKET NO. M&M-033-USA-PCT**

**CERTIFICATE OF MAILING**

I hereby certify that this amendment, transmittal and three declarations in Docket No. M&M-033-USA-PCT, Serial No. 09/719,166, is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to:

Assistant Commissioner for Patents
Washington, D.C 20231

on March 6, 2003



Donald E. Townsend

Donald E. Townsend